

CLAIMS

1. A method comprising:

providing user interface information into firmware on a USB device, the user interface information corresponding to the USB device; and

responsive to receiving a host-specific device request, communicating the user interface information to a requestor.

2. A method as recited in claim 1, wherein the user interface information comprises:

a custom property section comprised of one or more custom property entries, each custom property entry comprising information that corresponds to a respective custom property for the USB device.

3. A method as recited in claim 1, wherein the user interface information comprises:

a custom property section comprising one or more custom property entries, each custom property entry corresponding to a respective custom property for the USB device; and

a header section comprising an indication of the number of custom property entries for which mappings exist in the custom property section.

4. A method as recited in claim 1, wherein the user interface information is selected from information comprising an icon, a font, a picture, a label, a help page, or a URL.

1 5. A method as recited in claim 1, wherein the user interface
2 information is in a data format specified by an operating system.

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4 6. A method comprising
5 querying a USB device with a host-specific device request that corresponds
6 to a descriptor, the descriptor indicating user interface information corresponding
7 to the USB device; responsive to the querying, receiving the user interface
8 information; and
9 displaying a set of user interface elements specified by the user interface
10 information.

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13 7. A method as recited in claim 6, wherein the descriptor comprises:
14 a custom property section comprised of one or more custom property
15 entries, each custom property entry comprising information that corresponds to a
16 respective custom property for the USB device.

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18 8. A method as recited in claim 6, wherein the descriptor comprises:
19 a custom property section comprising one or more custom property entries,
20 each custom property entry corresponding to a single custom property for the USB
21 device; and
22 a header section comprising an indication of the number of custom
23 properties property entries for which mappings exist in the custom property
24 section.
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1 9. A method as recited in claim 6, wherein the set of user interface
2 elements are selected from elements comprising an icon, a font, a picture, a label,
3 a help page, or a URL.

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5 10. A method as recited in claim 6, wherein the user interface
6 information is in a data format specified by an operating system.

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8 11. One or more computer-readable media containing a computer
9 executable program that performs a method as recited in claim 6.

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11 12. In a USB device that responds to device requests from a host, the
12 device requests including USB-specific device requests with corresponding USB-
13 specified request codes and device-specific device requests with corresponding
14 device-specified request codes, the USB-specific device requests including a
15 GET_DESCRIPTOR device request with a corresponding GET_DESCRIPTOR
16 request code, a method of implementing a host-specific device request to display
17 user interface elements that correspond to the USB device, the method comprising:

18 receiving a GET_DESCRIPTOR device request that specifies a
19 predetermined index; and

20 responding to the GET_DESCRIPTOR device request by returning a
21 descriptor that corresponds in the USB device to the host-specific device request
22 for a device-specific request code, the descriptor specifying user interface
23 information corresponding to the USB device.[bgh1]

24 [bgh2]

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1 **13.** A method as recited in claim 12, wherein the user interface
2 information comprises:

3 a custom property section comprised of one or more custom property
4 entries, each custom property entry comprising information that corresponds to a
5 respective custom property for the USB device.
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7 **14.** A method as recited in claim 12, wherein the user interface
8 information comprises:

9 a custom property section comprising one or more custom property entries,
10 each custom property entry corresponding to a single custom property for the USB
11 device; and

12 a header section comprising an indication of the number of custom
13 properties property entries for which mappings exist in the custom property
14 section.
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16 **15.** One or more computer-readable media containing a computer
17 executable program that performs a method as recited in claim 12.
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19 **16.** A method comprising:
20 communicating a non-standard USB device request to a device; and
21 responsive to the communicating, receiving an extended property descriptor
22 from the device, the extended property descriptor specifying user interface
23 information corresponding to the USB device.
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1 17. A method as recited in claim 16, wherein the user interface
2 information comprises information that is used by an operating system to augment
3 a shell or user interface to represent the device.

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5 18. A method as recited in claim 16, wherein the extended property
6 descriptor further comprises a custom property section comprised of one or more
7 custom property entries, each custom property entry comprising information that
8 corresponds to a respective custom property for the device.

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10 19. A method as recited in claim 16, wherein the extended property
11 descriptor further comprises:

12 a custom property section comprising one or more custom property entries,
13 each custom property entry corresponding to a single custom property for the USB
14 device; and

15 a header section comprising an indication of the number of custom
16 properties property entries for which mappings exist in the custom property
17 section.

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19 20. A method as recited in claim 16, wherein the extended property
20 descriptor comprises user interface information corresponding to the USB device,
21 the method further comprising:

22 responsive to receiving the property descriptor, providing information
23 corresponding to the user interface information to computer program applications.
24
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1 **21.** A USB device comprising:
2 a processor;
3 a port coupled to the processor;
4 a memory coupled to the processor;
5 an extended property descriptor stored in the memory, the extended
6 property descriptor identifying a set of user interface information corresponding to
7 the USB device; and

8 a control program module stored in the memory, the control program
9 module being configured to send the extended configuration descriptor to a
10 requestor in response to receiving a host-specific device request at the port.

11
12 **22.** A USB device recited in claim 21, wherein the extended property
13 descriptor comprises:

14 a custom property section comprised of one or more custom property
15 entries, each custom property entry comprising information that corresponds to a
16 respective custom property for the USB device.

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18 **23.** A USB device recited in claim 21, wherein the extended property
19 descriptor comprises:

20 a custom property section comprising one or more custom property entries,
21 each custom property entry corresponding to a single custom property for the USB
22 device; and

23 a header section comprising an indication of the number of custom
24 properties property entries for which mappings exist in the custom property
25 section.

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2 **24.** A USB device recited in claim 21, wherein the set of user interface
3 information is in a data format specified by an operating system.

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5 **25.** A computer-readable storage medium containing computer-
6 executable instructions utilized by an application program to interact with a USB
7 device, wherein the computer-executable instructions comprise:

8 receiving a request from an application program for a descriptor that
9 specifies user interface information corresponding to the USB device;

10 querying the USB device with a host-specific device request to obtain the
11 property descriptor;

12 responsive to the querying, receiving the descriptor; and

13 providing the received property descriptor to the requesting application
14 program.

15
16 **26.** A computer-readable storage medium as recited in claim 25,
17 wherein the user interface information corresponds to information used to augment
18 a shell or user interface that is presentable to a user.

19
20 **27.** A computer-readable storage medium as recited in claim 25,
21 wherein the obtained property descriptor comprises:

22 one or more custom property sections, each custom property section
23 indicating information corresponding to a user interface element for the USB
24 device.

1 **28.** A computer-readable storage medium as recited in claim 25,
2 wherein the obtained property descriptor comprises:

3 a header section indicating the number of custom properties for which
4 mappings exist in the property descriptor; and,

5 one or more custom property sections, each custom property section
6 indicating information corresponding to a user interface element for the USB
7 device.

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9 **29.** A computer-readable storage medium as recited in claim 25,
10 wherein the user interface information is selected from information comprising an
11 icon, a font, a picture, a label, a help page, or a URL.

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13 **30.** A computer comprising one or more computer-readable media as
14 recited in claim 25.

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16 **31.** One or more computer-readable media containing a computer-
17 executable program for use in conjunction with a USB device that responds to
18 device requests from the program, the device requests including USB-specific
19 device requests with corresponding USB-specified request codes and device-
20 specific device requests with corresponding device-specified request codes, , the
21 program comprising:

22 receiving a host-specific request for an extended property descriptor from a
23 requestor, the extended property descriptor indicating one or more user interface
24 elements that correspond to the USB device;
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responsive to the receiving, communicating the extended property descriptor to the requestor.

32. One or more computer-readable media as recited in claim 31, wherein the property descriptor comprises:

a custom property section that corresponds to a user interface element associated with the USB device.

33. One or more computer-readable media as recited in claim 31, wherein the property descriptor comprises:

a header section indicating the number of custom properties for which mappings exist in the property descriptor; and,

one or more custom property sections, each custom property section corresponding to a respective user interface associated with the USB device.

34. A computer comprising one or more computer-readable media as recited in claim 31.

35. A computer-readable medium having stored thereon a data structure, comprising:

a first data field comprising data indicating a count indicating the number of control property entries for which mappings exist in a descriptor; and

one or more second data fields, the number of second data fields based on the count, each second data field comprising data corresponding to a custom property for a USB device.

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2 **36.** A computer-readable medium as recited in claim 35, wherein the
3 first data field further comprises:

4 a total descriptor length indication; and
5 a descriptor version indication.
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7 **37.** A computer-readable medium as recited in claim 35, wherein each
8 second data field further comprises:

9 a custom property section length indication;
10 a data type indication of the custom property;
11 a property name corresponding to the custom property; and
12 a set of property data corresponding to the custom property.
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